

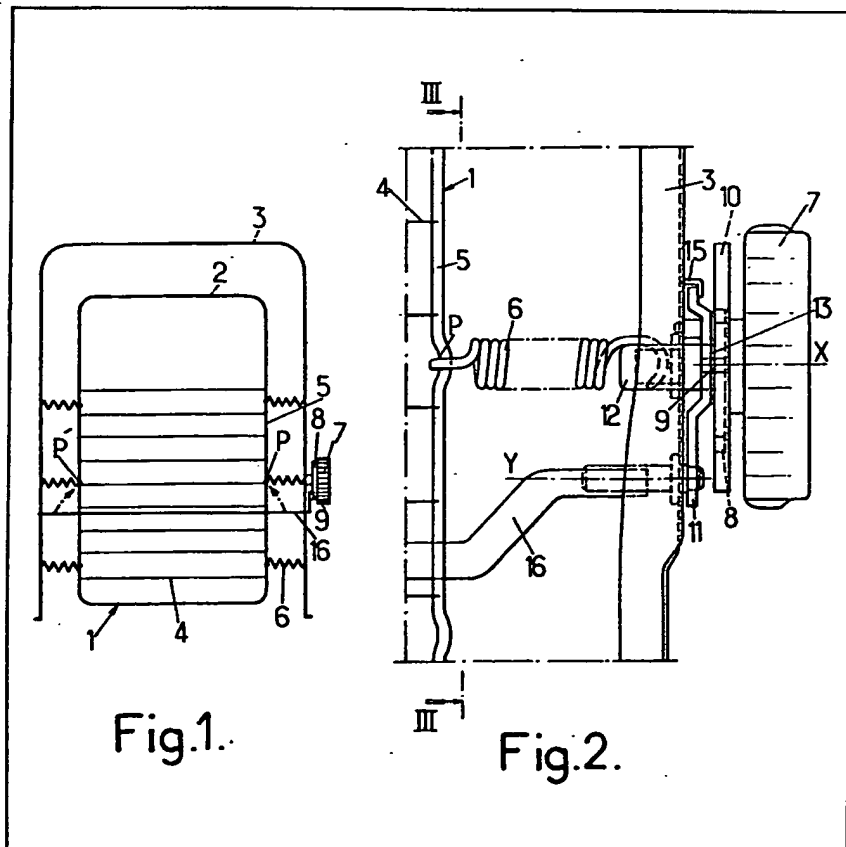
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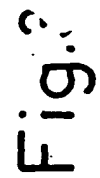
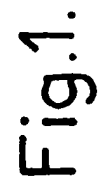
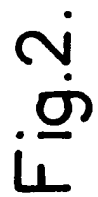
## (54) Adjusting seat backs

(57) A seat back comprising a back rest portion (1) extending between side frame members or lateral posts (5) which are themselves suspended on a rigid peripheral framework (3) and means for locally adjusting, by angular movement of a rotary control handle (7), the positions of intermediate points (P, P') of the two lateral posts (5) forwardly and rearwardly, the adjusting means comprising a spiral cam (8) angularly

fast to the rotary control handle (7), the slope of this spiral cam being sufficiently low to ensure the irreversibility of the control, a lever (11) which is fast to a rod (16) extending over the whole width of the seat back, is pivotably mounted on the rigid framework (3) about a fixed axis parallel to the axis of the rotary control handle (7), and has an end or finger (9) applied against the cam (8), and means for converting the angular movements of the rod due to those of the control handle into the desired movements of the points P and P'.



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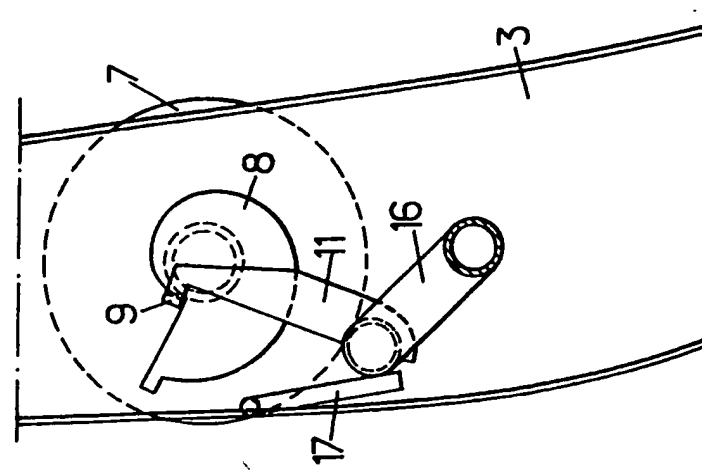


Fig. 5.

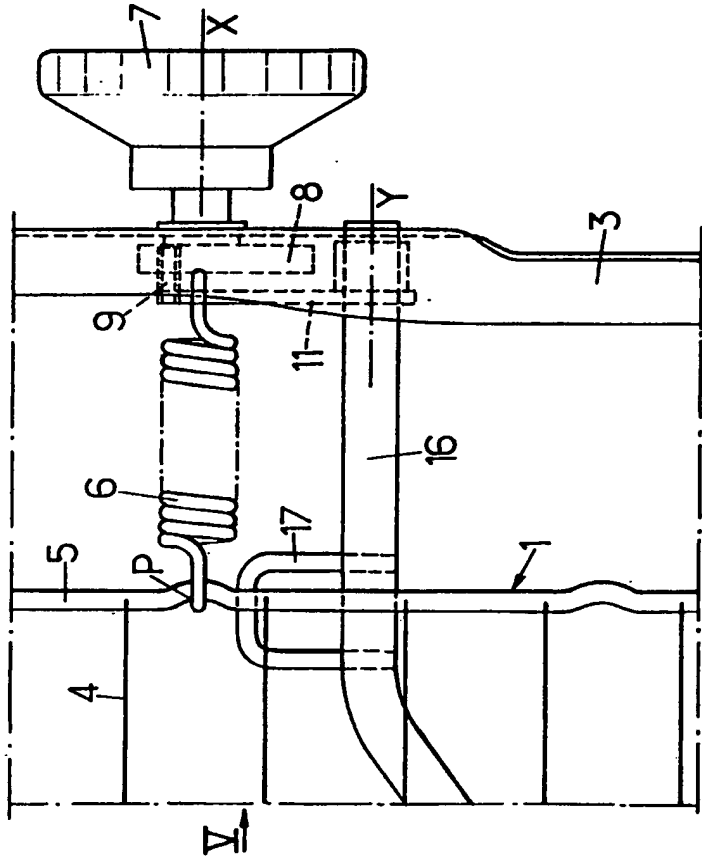


Fig. 4.

## SPECIFICATION

### Seat backs

The invention relates to seat backs, notably for vehicles. The seat back can comprise, at least in its lower half, a back rest portion supported or bounded externally by a frame (e.g. a pair of side frame members) itself suspended on a rigid peripheral framework.

Such seat backs are known which have means enabling the regulation, from angular movements of a control handle about a transverse horizontal axis (that is to say extending along the width of the seat), of the position which an intermediate point (P, P') of each of two side posts of the frame occupies in the "horizontal longitudinal" direction (that is to say, perpendicular to the middle surface of the back rest portion at this point), at least when a person is sitting on the seat equipped with such a seat back, so as to regulate the degree of lumbar support for the seated person.

In the known embodiments, the number of stable adjustment positions is limited and the locking of the mechanism at each of its adjusted positions involves a fragile and expensive notched locking system.

The present invention provides a seat back having a back support which at an intermediate height thereof can be locally adjusted in use in the forward and rearward directions relative to the remainder of the support, wherein such adjustment is effected by rotation of the spiral cam of a spiral cam and associated cam follower combination operatively connected to adjusting means which in use acts on the back support at the said height thereof, the angle of the spiral being such as to prevent in use rotation of the cam in the rearward adjustment sense under the force applied against the back support by a seated person.

The invention makes continuous adjustment possible and renders a notched locking system unnecessary.

The angle of the spiral cam, which may for example be a spiral groove in the face of a disc, is suitably of the order of 7 degrees. An operating handle is preferably provided, the cam rotating with angular movement of this handle. In some embodiments, the adjustment is effected only when the seat is occupied, the back support, in the absence of an applied load, adopting at the said intermediate height a forward rest position independently of the adjusting means.

Preferably, the back support comprises a back rest portion supported by and between side frame members and the side frame members are themselves suspended on a rigid peripheral framework, the adjusting means acting in use on the side frame members at the said intermediate height where each is locally adjustable in use in the forward and rearward directions relative to the remainder of itself. The cam follower may then be one end of a lever which is pivotally mounted on the rigid framework about an axis extending across the seat back and is connected to rod

65 extending across the back support, rotation of the cam causing movement of the lever and rod and the adjusting means in use converting such movement to the said adjustment of the side frame members. The adjusting means may then comprise lugs mounted on the rod or lever and these may act on the side frame members directly or via springs. The cam and an operating handle therefore may be mounted pivotably on a stub shaft secured to the rigid framework, or in a bore of a housing secured to the rigid framework.

In a seat back of the known type mentioned above having a control handle and side posts with intermediate points (P, P'), there may be provided according to the invention adjustment mechanism comprising a spiral cam angularly fastened to the control handle, the slope of this spiral being sufficiently small to ensure the irreversibility of the control, a lever fast to a rod extending along the whole width of the seat back and mounted to pivot on the rigid framework of this seat back around a fixed axle parallel to that of the lever, of which lever the end is applied against the cam, a first mechanism adapted to convert the angular movements of the rod due to those of the handle into the desired movements of the point P, and a second mechanism adapted to convert said angular movements of the rod into those desired of the point P'. Each transformation mechanism for the angular movements of the rod into

95 movements of a point P or P' may comprise an eccentric lug which is fast to the rod and which may, for example, be directly applied against a post of the frame at the point P or P' or be connected to the point P or P' by a spring stretched in a substantially horizontal transverse direction between the lug and point. The cam is suitably constituted by a groove channelled in a disc, in which case the control handle (e.g. a round handle) and the disc which is fast thereto can be mounted to pivot on a stub shaft itself welded to the framework of the seat back; or to pivot in a bore of a housing, itself made fast to the framework of the seat back, so that the disc presents its spiral groove on a front surface of the latter, opposite the end of the lever designed to co-operate with this groove.

The invention comprises, apart from these main features, certain other features which are preferably used at the same time and which will be more explicitly considered below.

In the following, some preferred embodiments of the invention are described purely by way of example, with reference to the accompanying drawings, in which:

120 Figure 1 shows diagrammatically in front elevation a seat back equipped according to the invention with a lumbar support adjusting mechanism;

Figures 2 and 3 show respectively, in front elevation and seen laterally along III—III, Fig. 2, parts of the adjusting mechanism of the Fig. 1 seat back; and

Figures 4 and 5 show respectively, in front elevation and seen laterally (with portions taken

away) along the arrow V of Fig. 4, another such mechanism for use according to the invention.

In each case, the seat back concerned, designed preferably for a vehicle seat, includes at least in its lower half a portion 1 bounded externally by a semi-rigid frame 2, itself suspended on a rigid peripheral framework 3 of the seat back.

Said portion 1 can itself be resilient and to this end constituted by springs disposed in zigzags or along separate lines, or again by rubber strips, the frame 2 then being mountable on the framework 3 by means of undeformable hooks.

It can also be constituted, as illustrated, by single inextensible metal wires 4 mounted parallel to one another between side posts 5 of the frame 2, the resilience of the seat back being then ensured by a flexible and resilient covering notably of foam, and by the elastic mounting of its frame on the framework of the seat back.

This frame extends preferably along a completely closed line and may be constituted by a curved metal wire or by a series of strips coupled together by means of flat sections bent at right angles.

It can in certain cases be limited to its two lateral posts 5.

The elastic suspension of said frame is advantageously ensured by a plurality of helical tension springs 6 stretched horizontally between the posts 5 of this frame and the rigid framework 3 of the seat back, itself constituted preferably, at least at the base of this seat back, by two parallel vertical flanges cross-braced by means of a generally tubular profiled element.

The portion 1 and its covering are designed to support the lumbar area and in particular the kidneys of a person sitting on the seat.

To adapt the support to the corpulence of this person, it is convenient to be able to adjust the "horizontal longitudinal" position, namely in a direction perpendicular to the surface of the portion 1, at two intermediate points P and P' of the posts 5 situated similarly at the level of the kidneys: the more these points are forward relative to the rest, the more the lumbar support is accentuated.

It will be noted that the above choice of the points P, P' is particularly judicious due to the fact that they are situated on both sides of the base of the vertebral column of the seated person, so that the accentuation of the lumbar support is not manifested by any increase in the support pressure exerted on this base, a condition necessary for comfort.

The adjustment provided for the illustrated seat back is by way of a rotary handle 7, a spiral cam 8 fast to this handle, and a finger 9 connected rigidly or not to the points P and P' and mounted so as to be able to slide against said cam, the slope of the spiral being sufficiently small to ensure the irreversibility of the mechanism.

For steel parts, this slope is of the order of 7 degrees.

Below will be described in more detail two

embodiments of such a mechanism, for which the movements of the finger 9 are transmitted to the points P and P' either flexibly through two of the springs 6, or rigidly.

In each case, the rotary handle 7 is in the form of a knob with a cylindrical milled or undulate skirt, pivotably mounted on one of the flanges of the frame-work 3 around a transverse horizontal axle X practically at the level of the point P.

In the first embodiment illustrated in Figs. 2 and 3, this knob 7 is fast to a disc 10 in which is channelled a spiral groove constituting the cam 8.

A rigid lever 11 is pivotably mounted on the side-plate 3 around a fixed axle Y parallel to the axle X.

A portion of this lever 11 constitutes the above finger 9.

A spring 6 of which one end is hooked to the frame 2 at the point P is hooked at its other end to a lug 12 forming part of the lever 11.

The angular movements of the handle 7 around the axle X are manifested by identical movements of the cam 8, and hence by angular movements of the finger 9 and of the lever 11 around the axle Y, which have the effect of moving in the "horizontal longitudinal" direction the hooking lug 12 of the spring 6 concerned.

Due to the fact of the semi-rigid constitution of the post 5, the latter movement is manifested by a similar movement of the point P, although of smaller amplitude, for example one half, and hence by a more or less pronounced bulging of said post 5 forwards.

It is to be noted that the control thus ensured is irreversible, in the sense that the support of the seated person against the seat back, and hence against the points P and P', rearwards of this seat back, can in no way draw the mechanism and its control knob in the direction tending to cause said points to move back.

In the embodiment illustrated in Figs. 2 and 3, a stub shaft or pivot 13 passing through the side-plate 3 and welded to the latter, is used to ensure the pivoting mounting of the handle 7 and of the disc 10 on this flange, this pivot 13 passing through this handle and this disc in close relationship.

To make the angular movements of the lever 11 around its axle Y possible, there is then provided in this lever a notch 14 adapted to straddle the pivot 13.

A rim 15 formed in the flange 3 serves to guide the free end of the lever 11 by a yoke-type hold.

The mechanism which has just been described, mounted on the base of one of the two side-plates 3 of the seat back, is repeated in part on the base of the other side-plate in the sense that there is again to be found on this other base a second lever pivotably mounted around the same axle Y as the above lever 11, to which it is made fast by a twist-resistant rod 16 and extending along this axle Y over the whole width of the seat back.

This second lever carries, like the first, a hooking lug for a spring which connects this lug to the point P' to be adjustably supported.

It is also guided by a rim formed in the corresponding side-plate, but neither the equivalent to the finger 9, nor the notch 14 is present since the cam and the handle are only provided on one side of the seat.

The presence of the pivot 13 at the center of the disc 10 may be a drawback as regards bulk, due to the fact that the start of the spiral is brought back to a radius greater than that of said pivot, that is to say, to a relatively great distance from the axle X.

To avoid this drawback, it is possible to eliminate the pivot concerned, by mounting the rotary handle 7 in a bore of a housing attached to the side-plate 3: the disc can then have opposite the finger 9 a front surface completely unobstructed at its center, which permits the spiral to start very close to the axle X and, consequently, a reduction in the outer diameter of the disc 10.

This construction also enables the need to provide the notch 14 in the lever 11 to be avoided.

In the embodiment illustrated in Figs. 4 and 5, the spiral cam 8 is constituted by the outer edge of a small plate.

Here is again to be found a rigid lever 11 of which a portion 9 is applied against the cam 8, which lever is fast to a transverse rod 16 extending along an axis Y parallel to the axis X and pivotally mounted on the two side-plates 3.

However it is no longer through springs 6 that the angular swings of this lever 11 or of this rod 16 are transmitted to the points P and P': this transmission is ensured here directly by two lugs 17 welded to the rods 16 and respectively supported against the two posts 5 of the portion 1, behind these posts, at the level of the points P and P'.

In this case the angular movements of the lever 11 due to the rotations of the handle 7 are directly transformed into movements of the points P and P', which permits the obtaining for these movements of amplitudes higher than those which can be obtained with the embodiment according to Figs. 2 and 3, to the detriment, it is true, of the flexibility of the support ensured at the level of said points P and P'.

Here again, the control is continuous and irreversible.

It is to be noted that the constitution of the spiral cams 8 by grooves, in accordance with the embodiment of Figs. 2 and 3, makes unnecessary special angular urging of the levers 11 to hold them applied against these cams.

In the embodiment of Figs. 4 and 5, this permanent application is ensured directly by the springs 6 themselves since the tension of these springs tends to apply the posts 5 of the frame of the sheet constantly against the lugs 7 fast to said levers 11 and hence the latter against the cams 8.

The invention is no way limited to the embodiments described above, but includes modifications, e.g. where the adjustment of the position of the points P and P' is effective when the seat is occupied, the points naturally adopting

a rest position which is more advanced and independent of the adjustment mechanism as long as the seat is not occupied and not being forced towards the rear, against two respective

adjustable stops in the manner described above, except when a person is sitting on the seat; the contact between the points and said stops may be directly ensurable or via any shock absorbing or resilient elements.

## 75 CLAIMS

1. A seat back having a back support which at an intermediate height thereof can be locally adjusted in use in the forward and rearward directions relative to the remainder of the support, wherein such adjustment is effected by rotation of the spiral cam of a spiral cam and associated cam follower combination operatively connected to adjusting means which in use acts on the back support at the said height thereof, the angle of the spiral being such as to prevent in use rotation of the cam in the rearward adjustment sense under the force applied against the back support by a seated person.

2. A seat back according to claim 1, wherein the angle of the spiral is of the order of 7 degrees.

3. A seat back according to claim 1 or 2, wherein the cam is constituted by a spiral groove in a face of a disc.

4. A seat back according to any preceding claim including an operating handle, the cam rotating with angular movement of the handle.

5. A seat back according to any preceding claim, in which, in the absence of an applied load, the back support adopts at the said intermediate height a forward position independently of the adjusting means.

6. A seat back according to any preceding claim, wherein the back support comprises a back rest portion supported by and between side frame members and the side frame members are themselves suspended on a rigid peripheral framework, the adjusting means acting in use on the side frame members at the said intermediate height where each is locally adjustable in use in the forward and rearward directions relative to the remainder of itself.

7. A seat back according to claim 6, wherein the cam follower is one end of a lever which is pivotally mounted on the rigid framework about an axis extending across the seat back and is connected to a rod extending across the back support, rotation of the cam causing movement of the lever and rod and the adjusting means in use converting such movement to the said adjustment of the side frame members.

8. A seat back according to claim 7, wherein the adjusting means comprises lugs mounted on the rod or lever.

9. A seat back according to claim 8, wherein a lug acts directly, in use, against each side frame member.

10. A seat back according to claim 8, wherein the lugs are connected to the side frame members by springs.

11. A seat back according to any of claims 6 to 10, including an operating handle, the cam rotating with angular movement of the handle, and the cam and handle being mounted pivotably on a stub shaft itself secured to the rigid framework.
12. A seat back according to any of claims 6 to 10, including an operating handle, and the cam rotating with angular movement of the handle, the cam and handle being mounted pivotably in a bore of a housing itself secured to the rigid framework.
13. A seat back substantially as hereinbefore described with reference to Figs. 1 to 3 of the accompanying drawings.
14. A seat back substantially as hereinbefore described with reference to Figs. 4 and 5 of the accompanying drawings.
15. A seat back comprising on the one hand, at least in its lower half, a sheet supported externally by a frame, itself suspended on a rigid peripheral framework and on the other hand, means for adjusting, from angular movements of a control handle with a transverse horizontal axle, the position of an intermediate point (P, P') of each of the two lateral posts of the frame in the longitudinal horizontal direction, characterised in that said adjusting means comprise a spiral cam angularly fast to the control handle, the slope of this spiral being sufficiently low to ensure the irreversibility of the control, a lever fast to a rod extending over the whole width of the seat back and pivotably mounted on the rigid framework of this seat back around a fixed axle parallel to the axle of the control handle of which lever the end is applied against the cam, a first mechanism adapted to convert the angular movements of the rod due to those of the control handle into the desired movements of the point P and a second mechanism adapted to convert said angular movements of the rod into those desired of the point P'.
16. A seat back according to claim 15.

characterised in that the slope of the spiral is of the order of 7 degrees.

17. Seat back according to claim 15 or 16, characterised in that each mechanism for the conversion of the angular movements of the rod into movements of a point P or P' comprises an eccentric lug fast to the rod.
18. Seat back according to claim 17, characterised in that each eccentric lug is directly applied against a post of the frame, at the point P or P'.
19. Seat back according to claim 17, characterised in that each eccentric lug is connected to the point P or P' by a spring stretched in a substantially transverse horizontal direction between this lug and this point.
20. Seat back according to claim 19, characterised in that the cam is constituted by a groove channelled in a disc.
21. Seat back according to claim 20, characterised in that the control handle, constituted by a round handle, and the disc which is fast thereto are mounted pivotably on a stub shaft itself welded to the frame-work of the seat back.
22. Seat back according to claim 20, characterised in that the control handle, constituted by a round handle, and the disc which is fast thereto are mounted pivotably in a bore of a housing, itself made fast to the frame-work of the seat back, so that the disc presents its spiral groove on a front surface of the latter, facing the end of the lever designed to cooperate with this groove.
23. Seat back according to any one of the preceding claims, characterised in that the adjustment in position of the points P and P' only relates to the occupied state of the seat, the sheet being arranged so that these points remain naturally in a more advanced resting position and independent of said adjustment as long as the seat is not occupied.